ence can be justified in seeking unaided to enlighten the world upon these questions.

The fact is that a large part of the literature relating to the palæolithic and ice-age questions is so hopelessly embarrassed with the blunders and misconceptions belonging naturally to the initial stages of the investigation that it is but little more than a stumbling-block to science, notwithstanding the possibility that there may be many hints of truth in what has been written. It would appear to be a more collossal task, however, to discover these hints of truth in the literature of to-day than to wrench them afresh from the rocky tomes of nature.

In conclusion, I would add that if there was, as is claimed, an ice-age man or at any time a palæolithic man in eastern America, the evidence so far collected in support of these propositions is so unsatisfactory and in such a state of utter chaos that the investigation must practically begin anew. That it will begin anew is rendered practically certain by the facts that geologists are now showing a decided disposition to take up that part of the work naturally belonging to them; and that primitive forms of art in stone are now for the first time receiving the critical attention necessary to make them available in a scientific discussion. Thus it appears that the suggestion embodied in the title of this communication may not be wholly unwarranted and inappropriate.

## THE NEST OF THE TRAP-DOOR SPIDER.

BY D. CLEVELAND, SAN DIEGO, CALIFORNIA.

The trap-door spider (*Mygale henzii* Girard) is widely diffused in California. While wandering over the Mesa (table lands), just back of this city a few months ago I was struck by the great number of their nests in favorable localities. In the adobe land hillocks are numerous; in fact, in many places, they are as thick as the ground will permit. They are about a foot in height, and some three or four feet in diameter. These hillocks, which are an interesting formation in themselves, are selected by the spiders, apparently, because they afford excellent drainage, and cannot be washed away by the winter rains. Their stony summits are often as full of spiders' nests as they well can hold. These subterranean dwellings are shafts sunk vertically in the earth, except where some stony obstruction compels the miner to deflect from a downward course. These shafts are from five to twelve inches in depth, and from one-half to one and a half inches in diameter, depending largely upon the age and size of the spider.

When the spider has decided upon a location, which is always in clay, adobe or stiff soil, he excavates the shaft by means of the sharp horns at the end of his mandibles, which are his pick and shovel and mining tools. The earth is held between the mandibles and carried to the surface. When the shaft is of the required size, the spider smooths and glazes the wall with a fluid which is secreted by herself. Then the whole shaft is covered with a silken paper lining, spun from the animal's spinnarets.

The door at the top of the shaft is made of several alternate layers of silk and earth, and is supplied with an elastic and ingenious hinge, and fits closely in a groove around the rim of the tube. This door simulates the surface on which it lies, and is distinguishable from it only by a careful scrutiny. The clever spider even glues earth and bits of small plants on the upper side of his trap-door, thus making it closely resemble the surrounding surface.

The spider generally stations itself at the bottom of the tube. When, by tapping on the door, or by other means, a gentle vibration is caused, the spider runs to the top of his nest, raises the lid, and looks out and reconnoitres. If a small creature is seen, it is seized and devoured. If the invader is more formidable, the door is quickly closed, seized and held down by the spider, so that much force is required to pry it open. Then, with the intruder looking down upon him, the spider drops to the bottom of his shaft.

A young friend of mine has spent much time lately watching and investigating the operations of this spider. He found by many experiments—all with the same result—that when the door of his nest is removed, the spider can renew it five times—never more than that. Within these limitations, the door torn off in the evening was found replaced by a new one in the morning. Each successive renewal showed, however, a greater proportion of earth, and a smaller proportion of silk, until, finally, the fifth door had barely enough silk to hold the earth together. The sixth attempt, if made, was a failure, because the spinnarets had exhausted their supply of the web fluid. When the poor persecuted spider finds his domicil thus open and defenceless, he is compelled to leave it, and wait until his stock of web fluid is renewed.

From forty to fifty cream-colored spiderlings are hatched from the yellow eggs at the bottom of the nest. When these have attained only a fraction of their full size—before they are half grown—their affectionate mother drives them out into the world to shift for themselves. After a brief period of uncertainty, they begin active life by making nests, each for itself, generally close to "the old homestead," sometimes within a few inches of it. These nests are always shallow and slender, and are soon outgrown. When the spider attains its full size it constructs a larger nest.

The spider is seldom seen outside of its nest, which it rarely leaves—during the day, at least, and then only for a few minutes, and for a short distance. Upon any alarm, it hastens to its nest, lifts the door, which quickly springs back into its place, and is held down by the householder until the alarm has subsided.

I now have a large nest, containing a mother and her yellow spiderlings, which I am carefully watching and studying.

## BALANCES OF THE PERUVIANS AND MEXICANS.

BY WALTER HOUGH, WASHINGTON, D.C.

THE employment of weights and measures among the existing uncultivated peoples is a subject upon which but little information has been gathered. The following instances of the use of balances and weights in pre-Columbian America are interesting from an archæological point of view.

In the Archæological Museum of Madrid there are two pairs of balances and four beams, from sepulchres of the Yncas at Pachacamac, Peru. The possession of this probably oldest weighing appliance by the ancient Peruvians is very curious. A flat strip of bone suspended edgewise by a cord midway forms the beam. To the ends of the beam are hung, by short cords, slings of net-work made of fine thread, the free edges being strengthened by cord.

One of these balances is plain, while the beam of the other is elaborately fretted and engraved with circles-and-dots, and curves outlining the fretted spaces. Red paint has been rubbed in these incisions. The long suspending cord is strung alternately with a row of small beads of turquoise and red and white shell and a large, flat, oblong piece of shell pierced through the axis. The string is terminated by the figure of a bird and a fret ornament of shell representing a seated human figure with head-dress. Three small pendants of beads and shell hang below this and the whole forms an ornate and striking specimen.

One of the beams exhibited is of bone, ornamented with circles-and-dots, so regular, that they would appear to indicate the use of another instrument of precision, the compass.

Dr. Brinton has ascertained that the weights were small stones.[1] It would seem that, for the purpose of equalization of weights, the equilibrium of the beam being gauged by the eye, these balances are quite accurate. They are in perfect order at the present time.

In the Mexican collection at the Columbian Historical Exposition in Madrid there are two spherical objects of basalt, from the ancient Tarascos of Michoacan, which Dr. Troncoso, director of the Mexican National Museum, believes are weights. He supports this view by stating that at present the Indians use similar stone weights on their imperfect balances, which are formed of two small trays of wood, each suspended by three strings from the end of a wooden beam, which is balanced by a cord fastened at the middle.

It is possible that the use of the balance will be found to have been more extensive in America than is suspected.

[1] Proceedings Numismatic and Antiquarian Society, Philadelphia, 1891.